



**AN INVENTORY MANAGEMENT SYSTEM FOR EMELS GHANA**

**Applied Project**

**By**

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**DECLARATION**

I hereby declare that this Applied Project report is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

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I hereby declare that the preparation and presentation of the Applied Project Report were supervised in accordance with the guidelines on supervision of applied projects laid down by Ashesi University College.

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Date: 2<sup>nd</sup> May, 2017

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## **ABSTRACT**

Emels Ghana Ltd is a start-up all-naturals cosmetic retail store which seeks to provide clients with organic cosmetic products aimed at providing the skin and hair the essential nutrients to promote growth.

The purpose of this project is to aid Emels generate a simple and efficient inventory management system that would help solve its ineffective and complicated method of tracking inventory. This problem was deduced from constant interactions with the owners, who indicated that despite its poor marketing and inadequate funds, the issue of a complicated inventory management needed urgent attention. As such, the company wants a system that would reduce overstocking, aid in determining reorder levels of products, as well as determine the optimal order quantity of each product.

In deciding which tool to implement for the company, secondary research findings and interactions with the company to better understand how best the tool can serve the desired purpose. The size, as well as the financial state of the company were taken into consideration in designing the tool. This is because some tools may not fit in small companies due to their complexity, time needed to be allocated to them and the cost that may be associated with implementing. The final tool, Google Spreadsheets, was chosen due to its simplicity, cost effectiveness, and user friendliness. This tool when implemented is to reduce overstocking, while increasing sales and profitability.

## **TABLE OF CONTENTS**

|  |     |
|--|-----|
| DECLARATION .....  | ii  |
| ACKNOWLEDGEMENTS .....                                   | iii |
| ABSTRACT .....   | iv  |
| CHAPTER 1: INTRODUCTION .....                            | 1   |
| 1.1 COMPANY PROFILE: EMELS GHANA LTD .....               | 1   |
| 1.2 SWOT ANALYSIS .....                                  | 2   |
| Strengths .....  | 3   |
| Weaknesses .....   | 4   |
| Opportunities .....                                      | 5   |
| Threats .....  | 5   |
| 1.3 PEST ANALYSIS .....                                  | 6   |
| Political Factors .....                                  | 6   |
| Economic Factors .....                                   | 6   |
| Social Factors .....                                     | 7   |
| Technological Factors .....                              | 8   |
| 1.4 INDUSTRY ANALYSIS .....                              | 9   |
| CHAPTER 2: PROJECT NEEDS ANALYSIS .....                  | 11  |
| 2.1 NEEDS ASSESSMENT .....                               | 11  |
| 2.2 PROBLEM STATEMENT .....                              | 13  |
| 2.3 SCENARIOS .....                                      | 14  |
| 2.4 RELEVANCE OF PROJECT .....                           | 14  |
| CHAPTER 3: MASTERY OF SUBJECT MATTER .....               | 16  |
| 3.1 INVENTORY .....                                      | 16  |
| 3.2 INVENTORY MANAGEMENT .....                           | 17  |
| 3.3 INVENTORY MANAGEMENT TECHNIQUES .....                | 18  |
| ABC Analysis .....                                       | 18  |
| Economic Order Quantity (EOQ) .....                      | 19  |
| Material Requirement Planning (MRP) System .....         | 19  |
| Enterprise Resource Planning (ERP) System .....          | 20  |
| 3.4 CASE STUDY .....                                     | 20  |
| 3.5 DIFFERENT PERSPECTIVES OF INVENTORY MANAGEMENT ..... | 22  |
| 3.6 CHAPTER CONCLUSION .....                             | 23  |
| CHAPTER 4: SOLUTION AND IMPLEMENTATION PLAN .....        | 25  |
| 4.1 REASONS FOR CHOOSING TOOL .....                      | 25  |

|   |    |
|---|----|
| 4.2 DESCRIPTION OF TOOL .....                     | 26 |
| 4.3 USE OF TOOL .....                             | 27 |
| 4.4 BREAKDOWN OF TOOL .....                       | 27 |
| ABC Classification Tool .....                     | 28 |
| EOQ Tool .....                                    | 29 |
| Inventory Tool .....                              | 30 |
| 4.5 CHAPTER CONCLUSION.....                       | 31 |
| CHAPTER 5: CONCLUSION AND RECOMMENDATIONS .....   | 32 |
| Recommendations .....                             | 32 |
| Conclusion .....                                  | 33 |
| BIBLIOGRAPHY .....                                | 34 |
| APPENDIX .....                                    | 39 |
| Figure 1: Swot Analysis of Emels Ghana .....      | 39 |
| Figure 2: Website of Emels Ghana Ltd.....         | 40 |
| Figure 3: Trusted Brands of Emels Ghana Ltd ..... | 40 |
| Figure 4: ABC Classification Tool for Items ..... | 41 |
| Table 1: Formulas used .....                      | 42 |

## **CHAPTER 1: INTRODUCTION**

Emels Ghana Ltd. is a Ghanaian based company that seeks to improve its operations. This chapter gives an insight of what Emels does and what it seeks to achieve in the near future, as well as analysis on its current location, Ghana, through a PEST analysis. Also, the occurrences of the internal environment, which is the personal care industry, would be elaborated on.

### **1.1 COMPANY PROFILE: EMELS GHANA LTD**

Emels is a Ghanaian personal care company, founded by Mrs. Emilia Berko Bempong and co-founded by two of her children; Richard Boakye Bempong and Georgette Bosompemah Bempong, with the earnest desire to propagate the use of eco-friendly beauty products. In so doing, they intend to contribute to a healthier lifestyle and better environment through the promotion of all-natural and organic beauty products.

They believe that beauty enhancement can be attained without compromising purity and the wellbeing of the user. As such, the products sold by Emels are sourced from nature's finest, free from chemicals such as parabens, and sulfates.

**Vision:** to contribute to the reduction in the use of potentially harmful products through the awareness and supply of healthy, natural cosmetics.

**Mission:** To empower people to look and feel good without compromising their well-being by retailing natural products that are truly wholesome, which do not only benefit individuals, but also the environment.

**Promise:** We refuse to sell products that contain unnecessary elements.

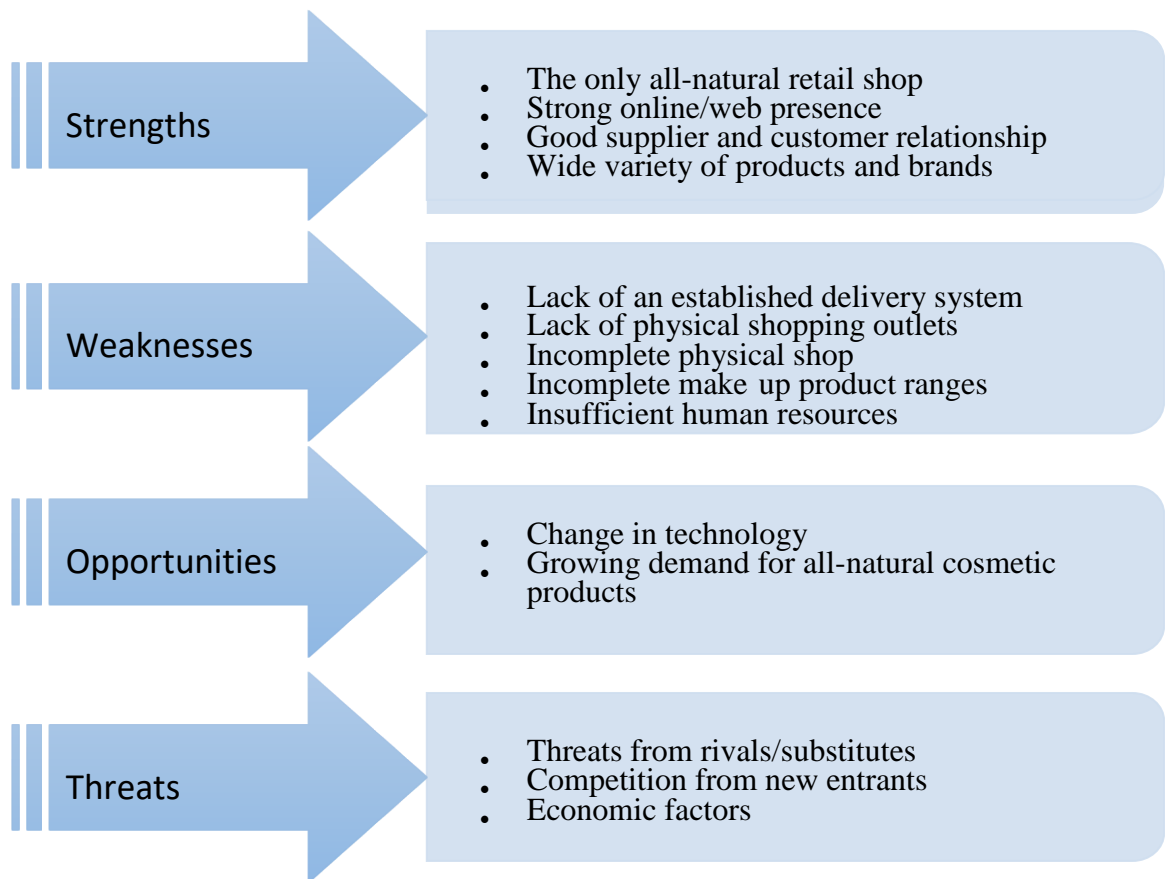
All natural, organic, healthy, vegan and clean products are what we will bring you, and that's a promise.

Emels currently deals with six trusted eco-friendly and organic brands, which they believe tie into their mission and vision. These brands are Alaffia, Pure Anada, Hurraw, Darcy's Botanicals, Novan and Skin Gourmet. There is also a blog on the company's website that informs clients and potential clients of health tips for their skin, hair and wellbeing.

## **1.2 SWOT ANALYSIS**

To deeply understand the health of Emels, there is a need to conduct a SWOT analysis. The SWOT analysis below informs us of what the company does extremely well, its shortfalls, the opportunities it has at its disposal, as well as the threats it is likely to face in the all-natural cosmetics industry. Figure 1 below shows a summary of the SWOT analysis of Emels.



**Figure 1: SWOT Analysis of Emels Ghana Ltd.****Strengths**

- *The only all-natural retail shop* – Emels is the only all-natural retail shop that sells all-natural cosmetic brands from Ghana and all around the world. This has made the company more appealing to expats, foreigners living in Ghana and the few health-conscious Ghanaians.
- *Strong online/web presence* - to reach their target market, as well as inform existing and potential clients of products and brands available, Emels has sought to use social media platforms such as Facebook, Instagram and Twitter, which are the world's most used platforms as well as a personal website for advertising of goods and creating awareness.

Clients have access to health tips and advice, which are intended to help them choose the right products for the right needs.

- *Good supplier and customer relationship* - Emels has built a personal and direct relationship with the suppliers and customers of their products, making it easy and faster to access new stock.
- *Wide variety of products and brands* - clients have access to a wide variety of products, which are targeted at their various needs. Having this inculcated into their business strategy gives Emels an added advantage.

### **Weaknesses**

- *Lack of an established delivery system* – the company solely relies on DHL for its deliveries, which offers only next-day deliveries. As such, the company tends to lose out on clients who want the products on the same day.
- *Lack of physical shopping outlets* – Emels sells through other shopping outlets on contract basis. Recently, their contract got terminated by the owner of the outlet they usually pushed their products through.
- *Incomplete physical shop* – the company's physical shop is located on the Spintex road; however, it is incomplete. Thus, there is no physical presence for people to try out their products before purchasing, especially with the makeup products.
- *Incomplete makeup product ranges* – the product ranges for the makeup products are incomplete. In the sense that the company has every other

besides bronzers, highlighters and contour sets. As such clients who might just need these products would go elsewhere to purchase them.

- *Insufficient human resources* – Emels does not have enough hands-on deck. For instance, it has no employee to handle its online presence and orders. Recently, the company just found out from a client that their website is down; which is not good for business.

### **Opportunities**

- *Change in technology* - this forms a major part of the all-natural cosmetics industry, because as time passes by, things are being remodeled making production of goods very simple and fast. Clients can access their products irrespective of their location, and can also make payments via mobile money or credit cards. This would make the tracking of cash and its receipt very fast and easy.
- *Growing demand for all-natural cosmetic products* - the growing trend for all-natural cosmetics products is due to people becoming consciously aware of their health. Ghanaians have developed a strong taste for organic products, resulting in some strong prospects for growth in this industry.

### **Threats**

- *Threats from rivals/substitutes* - competition in the hair care and skincare industry is very rampant. Although there are organic products which are healthy and safe for the body, some clients still prefer the chemical products because they work faster than all natural products. Companies

keep coming up with different products which tend to tackle the same problem and this poses a threat to Emels.

- *Competition from new entrants* – since this is an emerging market, Emels faces the possibility of others entering the market and this would have an adverse effect on the business.
- *Economic factors* - Economic factors such as high inflation rates and the continuous depreciation of the Ghana cedi, will affect the prices of goods, resulting in the probable loss in clients. High interest rates would also deter Emels from borrowing from banks.

### **1.3 PEST ANALYSIS**

#### **Political Factors**

Ghana is a West African country that is highly recognized for its political stability and this has gone a long way to attract numerous foreign investments (BBC.com, 2017). Ever since its convergence to a multi-party system of governance, Ghana has continuously ranked among the top three in Africa for freedom of the press as well freedom of speech (Worldbank.org, 2017).

#### **Economic Factors**

The Ghanaian economy mostly depends on natural resources, from sectors such as agriculture, mining and oil industry (BBC.com, 2017). It is also the second largest exporter of cocoa in the world and the second largest exporter of gold in Africa. The economy has endured a growing public deficit, extortionate inflation as well as a weakening currency (BBC.com, 2017). These incidences have resulted in the country resorting to several economic bailouts

from the International Monetary Fund (IMF) (BBC.com, 2017). The economy grew in 2016, although it experienced a decrease in its interest rate and inflation rate within that year (Tradingeconomics.com, 2016).

Due to the country's unsuccessful attempts to curb corruption, this has resulted in it ranking second in Sub-Saharan Africa, with a percentage of 76% (Transparency.org, 2015). With such a ranking, this would deter multinational companies from moving into the country, as well prevent the development of startup firms. In 2017, the economy is expected to experience low interest rate on bank loans, hence enabling startup firms to acquire the necessary funding needed for the daily operations of their businesses (Tradingeconomics.com, 2016).

A high exchange rate shows that it is more expensive to import inputs for business operations. The GHC/US exchange rate was about GHC4.39/\$1 as at 2nd February 2017, which was GHC 0.09 more than the year ending December 2016 (Exchange-rates.org, 2017). However, overall, the country is expected to grow at an estimate of \$70.4 billion in 2018 (Lucintel.com, 2014).

### **Social Factors**

Ghanaians have currently become highly responsive to the numerous social issues they tend to face on a regular basis (Amazon S3, 2015). These issues range from sanitation down to corruption, amongst others. The country has also been battling with issues pertaining to high unemployment rates. As of 2016, Ghana has been known to record the highest youth unemployment rates in the world (Ghanabusinessnews.com, 2016). However, measures are being put in place to help solve this problem. As such, a five-year project, YIEDIE, has been

created to provide economic opportunities in the country's construction sector for unemployed youth across Ghana (Ghanabusinessnews.com, 2016). The participants would be grounded in both technical construction and entrepreneurial skills (Ghanabusinessnews.com, 2016).

Another social factor impeding on the success and development of businesses and human well-being is that of the constant power shortages across the country (Amazon S3, 2016). This has led to significant drawback of economic growth and productivity, hence resulting in workers being laid off and factories shutting down since they are not able to fulfill their obligations (Amazon S3, 2016).

### **Technological Factors**

Technology, to most of our knowledge, depicts a country's journey through growth and development. The country is known for its high internet speeds and the vast option of telecommunication networks which make this very viable (Austin, 2015). In 2015, the number of mobile data subscribers increased by about 0.3% (Dasmani, 2016). This increase can be attributed to the recent push for telecommunication companies in the country to broaden their network coverage and the increased availability of smartphones on the market (Dasmani, 2016). This can be reiterated on the basis that this has resulted in a positive effect on businesses, as individuals can easily interact with associates from overseas.

Also, due to technology, there are now hardware and software tools that aid in tracking inventory such as food, clothing, books and gadgets automatically (Hanson, Ackah & Agboyi, 2015). These modern inventory tools are mostly based on barcode technology, aiding retail centers and other companies to use

barcodes to encode merchandise for inventory (Hanson, Ackah & Agboyi, 2015). These modern systems are also known as ERP systems that work in real-time to transmit information to a central computer system as transactions occur (Hanson, Ackah & Agboyi, 2015).

#### **1.4 INDUSTRY ANALYSIS**

The personal care industry, also known as the cosmetics industry, has become one of the daily necessities of individuals due to the fact that individuals are becoming more and more conscious about their health and wellbeing (Newsghana.com, 2012). Hence, the market and demand for these products are constantly on the rise (Newsghana.com, 2012). In order to satisfy this growing demand, already existing companies and startups, are coming up with products, be it new or modified (Newsghana.com, 2012). Besides individuals becoming health conscious, market research also shows that this sector is growing rapidly also due to demographic factors, aggressive advertisements and promotions, as well as changes in lifestyle and standard of living (Newsghana.com, 2012).

The future of the personal care industry is very promising, however the recent challenge, is the existence of organic and natural products (Newsghana.com, 2012). During a Business-to-Business meeting in 2013, between Ghana and Turkey, the co-ordination of the meeting, Metin, stated that Ghana was chosen for the exhibition of their products because they realized that Ghana has great potential as a stable democracy (Graphic.com, 2013). He also made mention of the fact that the cosmetics industry is a fast growing one and as such, measures are being put in place to establish a plant in Ghana, to produce cosmetic products locally (Graphic.com, 2013). This would in turn boost the

Ghanaian economy, hence, create employment in the country (Graphic.com, 2013).



## **CHAPTER 2: PROJECT NEEDS ANALYSIS**

This chapter is intended to discuss the problems faced by Emels in the cosmetics industry as an emerging all-naturals organic. These problems are going to be fished out through research and analysis as well as continuous interactions with the company. Also, the need for the attention given to the deduced problem, inventory management, would be addressed.

### **2.1 NEEDS ASSESSMENT**

The purpose of the needs assessment is to get to fish out the various problems faced by the company and which needs the most immediate attention. This was done through face-to-face interactions with the founders as well as emails. Needs assessment can be done either by conducting a gap (or performance) analysis, a training needs analysis or a root-cause analysis (Franklin, 2005). The gap analysis is used when one determines that there is a performance problem, the root-cause analysis is used when one determines what caused the problem and last but not least, the training needs analysis is used to discover information needed to recommend or create a training solution (Franklin, 2005). However, for the basis of this project, the gap analysis is going to be used. This is because we want to discover the desired and current state of Emels' operations and see how best to bridge the gaps.

| <b>Key operations</b>          | <b>Challenges</b>                              | <b>Effects of challenges</b>   | <b>Desired outcome</b>   | <b>State of emergence<br/>1 – low, 2 – average, 3 – high</b> |
|--------------------------------|--|--|--|--|
| Marketing and brand management | Low social media engagement and blog posts     | Low clientele, hence sales   | An effective marketing plan for consistent flow of posts on social media platforms and blog. | 1  |
| Investment                     | Insufficient capital to complete physical shop | Relying on other shops to sell products through.                         | Ways to raise capital  | 2  |
| Inventory management           | Ineffective tracking of inventory              | Low sales, difficulty in tracking inventory, products expiring/spoiling. | Comprehensive and simple inventory management tool.  | 3  |

The table above shows a list of the current pressing needs of Emels in line with their state of emergency ratings. From the table, it can be deduced that the company has a gap in its marketing and brand management, investment

options as well as its inventory management. Per the ratings, the listed operations require abrupt attention. However, through further interactions, it was concluded that with an effective and simple way of tracking inventory, goods would be readily available to meet client's needs. Marketing and brand management scored the lowest rating because the company communicated that they already have a marketing plan but have not been successful in implementing it due to insufficient allocation of resources and time.

Although the company's own physical retail shop would enable the company increase and hold stock and better serve clients, it would be difficult for the firm to effectively track its inventory. As such, by tackling the issue with regards to inventory management, there would be an effective system already put in place to smoothly run operations.

## **2.2 PROBLEM STATEMENT**

Emels has been in operation since 2015 and as such, has quite a number of its operations which still need adverse attention. As a startup, it tends to overstock or understock its supplies of goods and this usually results in slow sales and loss of clients. Hence, an inefficient inventory management system.

Emels aims to improve upon its process of managing and tracking its inventory, which would help reduce the issue of overstocking, as well as make sure products are always readily available for clients. They also want to be able to know when to reorder and the quantity of products to order for each product. Emels' retail shop is still under construction. However, a space has been prepared in the shop for storing up goods. Due to this, goods are only sold

through the company's website as well as its social media platforms; Facebook and Instagram.

## **2.3 SCENARIOS**

A client calls Emels to place an order for a body butter, which the website says is available. However, to the client's dismay, the product is not available. The client then moves on to get another alternative. Emels then loses a client and the sales it would have obtained from the purchase.

Another scenario is when Emels orders a large lot of body and hair oils which tend to have short shelf life. As such, in order to prevent them from going bad before they are sold, Emels takes the price-cut approach where prices are cut down by a percentage in order to let the products move fast from storage. This is purely because of the company not knowing the right amount of the products to order, hence resulting in overstocking and probable product spoilage.

## **2.4 RELEVANCE OF PROJECT**

Inventory management forms an integral part of every company's operations, be it whether the company is rendering services or manufacturing or delivering goods. Having a well-structured inventory management system, helps to improve customer service and also helps the company to hedge against uncertainties in demand and price changes (Naliaka & Prof. Namusonge, 2015). That being said, it is incumbent on Emels to have a well laid out inventory management system to help them curb the problem of losing clients and not being able to meet timely demands.

Also, this project would not only provide the company with a simple and efficient inventory management system, but would also enable the student to apply in-depth knowledge of inventory management which have been derived from both operations management and supply chain management courses. This knowledge is to aid in designing an inventory management system whereby inventory will be effectively and efficiently managed, to help curb the issue of ineffective inventory management method of the company.

### **CHAPTER 3: MASTERY OF SUBJECT MATTER**

This chapter provides an in-depth understanding of inventory and inventory management, as well as its effects on a company's operations, with the help of significant literature. Also, best practices of inventory management would be analyzed, to aid deduce what best fits in for Emels.

#### **3.1 INVENTORY**

Inventory forms an integral part of every company's operations and supply chain management, be it manufacturing or retail, large or small quantities. Inventory can be defined as "*the entire stock of a business which include raw materials, work-in-process, maintenance repairs and operations supplies and finished goods that are ready or will be ready for sale* (Oxford Dictionary, n.d; Heizer & Render, 2011)." The reasons why companies keep inventory are and not limited to the following (Anderson, Anderson & Parker, 2013):

- To be able to meet customer demands.
- To prevent disruptions in supply and deliveries.
- To be able to take advantage of quantity discounts by purchasing in lot sizes.
- To act as a hedge against fluctuations in prices.

Companies, in order to play safe and have a smooth operation, tend to hold four types of inventory – raw materials, work-in-process, maintenance,

repairs and operations supplies, and finished goods (Magloff, 2017). Raw materials are individual components which come together to make a finished product (Magloff, 2017). They can also be in the form of partially finished goods or materials. Work-in-process inventory are semi-finished items awaiting to be completed, finished goods which are yet to be packaged and/or inspected, and raw materials that have been moved from storage to the assembly line (Magloff, 2017).

Maintenance, repairs and operating inventories are all items needed for operation such as tools to repair defaulted machinery and equipment and office supplies (Magloff, 2017). Finished goods are products that have gone through all the necessary operations in the production line and are ready for sale, either for retail or wholesale purposes.

### **3.2 INVENTORY MANAGEMENT**

Inventory management forms an integral part of the supply chain and as such, a mismanagement would lead to an inventory shortage or surplus, hence resulting in loss of sales and clients (Heizer & Render, 2011). It helps bridge the gap between investments made towards inventory and services rendered to customers (Heizer & Render, 2011).

The objectives of an effective inventory management are and not limited to ensuring that raw materials are constantly supplied, risk of overstocking and understocking are minimized, a systematic record of inventory is maintained, as well as losses, damages and misappropriation of materials are reduced (Shah, 2017). It is important for every company to manage its inventory effectively and efficiently, to be able to hedge against fluctuations in demand, ensure a smooth

production and sales operation, and avoid stock outs (Naliaka & Prof. Namusonge, 2015). To effectively manage inventory, managers consider how inventory items can be classified and how accurate inventory records can be maintained (Heizer & Render, 2011).

When classifying inventory items, it is incumbent on the company to cross check to make sure that records kept are accurate; class A items are of great importance and class C items are less important. Record accuracy allows organizations to focus on items that are needed and making sure they do not run out. When records kept are accurate, the company can then accurately make decisions regarding ordering, scheduling and shipping (Heizer & Render, 2011).

### **3.3 INVENTORY MANAGEMENT TECHNIQUES**

There are various ways companies manage their inventory, with respect to the size of the inventory being held and the size of the company. Below are some of the techniques used by various companies in managing inventories.

#### **ABC Analysis**

The ABC analysis is generally used in the classification of inventory based on their value of importance (Muddassir, 2016). Inventory is usually broken down into three categories A, B and C, with items in category A being the most valuable (Muddassir, 2016).

The ABC analysis is derived from the Pareto principle which states that there are a “*critical few and trivial many*” (Heizer & Render, 2011). That is, companies should put inventory policies in place that will help focus resources



on the few critical inventory items and not the many trivial ones (Heizer & Render, 2011). By inculcating this technique, Emels can benefit from products being classified, aiding them to know which products to constantly focus on and which products bring in more revenue. Although all inventories are important, by classifying them into groups, resources would be efficiently used by concentrating on items that would be cost effective (Annor, 2012).

### **Economic Order Quantity (EOQ)**

EOQ is an inventory-control technique which aids in reducing overall ordering and holding costs (Heizer & Render, 2011). The EOQ helps in determining the quantity of goods to order and the reorder level (Sukhia, Khan, & Bano, 2014). EOQ assumes that demand is constant and known, lead time is known and consistent, orders arrive one batch at a time, no quantity discounts, stock outs can be avoided and variable costs involved are setup or ordering costs and holding or carrying costs (Heizer & Render, 2011). Since Emels does not have a system that tracks the maximum quantity of products to order and at what level to reorder for products, the proposed tool is going to be designed to inculcate the EOQ management technique.

### **Material Requirement Planning (MRP) System**

The MRP system is a system that helps control dependent-demand inventory automatically (Hanson, Ackah & Agboyi, 2015). Its main objective is “getting the right materials to the right place, at the right time” (Moustakis, 2000). It tells how much of the final good clients demand and when they need it, as well as the timing and quantity of each component required to satisfy the demand automatically (Hanson, Ackah & Agboyi, 2015). This system uses

information from a master production schedule, bill of materials, production cycle times and material needs, as well as supplier lead times to determine what material needs to be ordered and when it should be (Moustakis, 2000). Emels does not necessarily use an MRP system as it does not manufacture or produce its own products.

### **Enterprise Resource Planning (ERP) System**

The ERP system is a software system that helps companies integrate operations such as planning, manufacturing, sales, marketing, inventory management and financial across the enterprise (Hossain, Patrick, & Rashid, 2002). ERP modules can either work as stand-alone units or can be combined to best suit and integrate the company's operations (Hossain, Patrick, & Rashid, 2002). By implementing ERP systems, companies tend to have an enhanced operation which improves and controls their business processes, alongside reductions in their costs (Tambovcevs & Tambovceva, 2013). The complexity of the ERP system, as well as the costs associated does not enable SMEs such as Emels to integrate as they cannot afford it.

### **3.4 CASE STUDY**

The case study of Wholesale Boutique, a nationwide wholesale supplier of unique monogram-friendly items, personalized jewelry and fashion accessories, is a vivid epitome of the importance of managing inventory effectively as well as the overall benefits with which it comes with.

*“In 2009, the leaders of Wholesale Boutique made the strategic decision to move the bulk of their business onto the Web by launching their website:*

*www.wholesaleboutique.com. “The decision to move our business to the Internet offered such exciting growth potential, but it also introduced a layer of complexity that was new territory for us,” said Michael Berry, Wholesale Boutique’s eCommerce Director. “We could no longer handle the order volume using QuickBooks as our only application.”*

*During their peak season, they spent up to two hours just getting the orders out of QuickBooks Enterprise to process them. Their Shipping Department was nearly unmanageable because of the fact that QuickBooks had limited integration with UPS. They had to manually enter drop ship orders and other shipping information. Berry realized that the company needed to drastically change the way they processed orders if they wanted to keep up with all of their new business. He set out to find an order management system that would integrate with both QuickBooks Enterprise and the company’s eCommerce platform.*

*Berry’s search didn’t take long. He found Fishbowl in 2010 and he decided it was the right solution to solve Wholesale Boutique’s urgent inventory and order management challenges. Fishbowl is the No. 1 manufacturing and warehouse management software for QuickBooks users. Fishbowl’s training and support staff helped the company to quickly get set up and start improving their delivery times.*

*Wholesale Boutique started seeing positive results almost immediately after they started using Fishbowl. Fishbowl Warehouse has not only helped the company improve their delivery times and speed up their order management processes, but it has also improved their customer service. The time the company*

*used to spend solving order issues can now be devoted to further improving their customer's experience on their website and to finding new sources of growth. Keeping up with 30,000 orders a year would have been unthinkable for this company before they started using Fishbowl. Now they're gearing up to add even more capacity, and there's no limit to how big they can grow."* (Fishbowl, 2016)

### **3.5 DIFFERENT PERSPECTIVES OF INVENTORY MANAGEMENT**

In an article written by Gunasekaran, Forker and Kobu, it is important to help SMEs improve their competitive edge in the industry they are in (2000). Most of these companies operate with poor forecasting and planning systems and long cycle times. This has resulted in these companies having poor delivery time and high inventories. They further went on to state that the root solution to this problem is for SMEs to implement materials management systems based on MRP and JIT/Kanban concepts. Also, most SMEs face the problem of unreliable inventory control systems.

Although the aforementioned is worth considering, Mabert, Soni and Venkataramanan stated in their article that companies can also consider implementing ERP systems as well (2003). However, before considering implementing an ERP system, it is important to consider the size of your company as this system is mostly implemented by large companies. Most small and medium sized companies have sought to either implementing or in most cases are planning to implement these systems. Such SMEs, however, need to understand that it may not be possible to fit an ERP system to fit their goals and objectives. They either have to change their process to fit the ERP system they implement or customize the system to fit their process.

Dubelaar, Chow and Larson in their article “*Relationships between inventory, sales and service in a retail chain store operation*” also stated that for a retail shop to succeed, it needs an effective inventory management (2001). The best practices in managing inventory in retail require a balance between “*inventory and service levels, recognition of the importance of merchandise availability, and accurate store sales/inventory data.*” This balance was proven positive in the survey conducted by the authors on 101 chain store units. Inventory in retail shops, in most cases, are based on the principles of the Economic Order Quantity (EOQ) model.

### **3.6 CHAPTER CONCLUSION**

When making decisions pertaining to the management of inventory, there is the need to weigh the cost and benefits of keeping them in stock. By effectively managing inventory, the company would be able to find the optimal balance between the availability of products and their corresponding costs. This also relies heavily on the accuracy of records being kept, alongside their classification, which aids in determining the various items which need utmost attention and those which do not.

The mismanagement of inventory depicts that the company has either run out of stock and as such will not be able to meet demands or there are too many items in stock, which means that the company has money tied up in its inventory until they are sold (Magloff, 2017). As a result, it is incumbent on companies to put measures in place to effectively and efficiently manage their inventory so as to be able to satisfy demand and prevent issues of overstocking and understocking.

The information provided above would also serve as a guidance to providing Emels with an effective and efficient inventory management system that would simplify the tracking of inventory, while reducing cost, preventing spoilage, understocking and overstocking, and increasing productivity.

## **CHAPTER 4: SOLUTION AND IMPLEMENTATION PLAN**

Emels Ghana wants to be able to handle its inventory efficiently so as to prevent overstocking and at the same time be able to know how much of each item needs to be in stock. They also need to be able to track inventory in such a way that would improve productivity and ensure customer satisfaction.

To be able to design a tool that would tackle the aforementioned without any complications, information was retrieved from the company via face-to-face interviews, a detailed needs assessment, as well as secondary information from online journal articles. This information served as a guidance which informed the decision for the proposed tool. Although there is a pressing need to solve the problem, certain factors come to play, the size of the company and its financial stability. Emels is a small startup and as such would not need a complicated tool that would best fit in a big company. Their size requires an easy, cheap, simple, scalable tool that would get the job done. The tool should also be easily transferable in the case where the company decides to expand its operations to other locations.

### **4.1 REASONS FOR CHOOSING TOOL**

This tool was chosen for its simplicity. It already has sections which have been embedded with formulas which automatically calculate for the reorder level, keeps track of inventory as well as the economic order quantity level. Also, the excel sheets are stored up in the clouds, allowing for easy accessibility anywhere and at any time. The salesperson can determine who has access to information on the sheets. This would also reduce the avenue for mistakes being

made. Employees can access an update inventory from multiple locations without having to email spreadsheets back and forth.

Another important reason is that as the company expands, the spreadsheets can be easily adjusted to suite the size of the company. The tool also allows for real time collaboration, keeping inventory up-to-date irrespective of location. Automated alerts can be set for when to bring in inventory and to notify when quantities are nearing the reorder level. Also, attachments pertaining to orders and supplier information can be uploaded on sheets for future reference.

## **4.2 DESCRIPTION OF TOOL**

The prescribed tool requires a computer or any smart device such as smart phones and tablets to be able to access it. There is also the need for internet connectivity since the tool is hoisted on an online database; google spreadsheets. The excel spreadsheet allows for updates to be made as of when needed. The user can also update offline in the case where internet is not stable, and can be later saved once internet stability is restored. The spreadsheet also helps to identify when to reorder stock, reduce excess inventory, access supplier information and easily locate items in storage.

Also, automated alerts can be set for when to take inventory and notify when quantities are nearing the reorder level. Attachments pertaining to orders and supplier information can be uploaded on the spreadsheets for future reference. If a product is being discontinued, the tool creates an option for it to be updated and in the case where the company decides to go back to it, all previous data would still be available.



### **4.3 USE OF TOOL**

The tool should specifically on a regular basis, be managed by the salesperson and supervised by the owners of Emels. Since the tool highly depends on information inputted which would determine the quality, accuracy and authenticity of the end results, it is advisable to limit its access. This would also enable the company measure the impact of the tool, hence increasing sales as customers would be rest assured of receiving the products they demand for.

The tool should be updated as often as inventory comes in and goes out. When the sale of a product is being discontinued, it should be updated on the sheet so that all parties would be made aware. Updates would only be possible with the aid of a smart device and access to a stable internet connection.

### **4.4 BREAKDOWN OF TOOL**

Due to the needs of the Company and the type of tool they require. The proposed inventory tool had to be broken down into three parts to ensure the adverse simplicity and efficiency.

**ABC Classification Tool**

| ABC INVENTORY CLASSIFICATION |  |                     |                       |                       |                          |                                       |                |
|------------------------------|--|---------------------|-----------------------|-----------------------|--------------------------|---------------------------------------|----------------|
| Inventory Id                 | Product Name   | Cost per Unit (GHS) | Annual Demand (Units) | Annual Turnover (GHS) | Contribution to Turnover | Cumulative Percentage Annual Turnover | Classification |
| IN0003                       | Alaffia Conditioner                                      | 23.64               | 700                   | 16548                 | 11.8%                    | 11.8%                                 | A              |
| IN0002                       | Alaffia Shampoo  | 23.64               | 700                   | 16548                 | 11.8%                    | 23.6%                                 | A              |
| IN0001                       | Alaffia Beautiful curls leave-in conditioner             | 31.64               | 500                   | 15820                 | 11.3%                    | 35.0%                                 | A              |
| IN0004                       | Alaffia Beautiful curls shampoo                          | 31.64               | 500                   | 15820                 | 11.3%                    | 46.3%                                 | A              |
| IN0018                       | Detoxifying clay mask                                    | 21.00               | 560                   | 11760                 | 8.4%                     | 54.7%                                 | B              |
| IN0017                       | Skin Gourmet's Baobab & Shea Body Butter                 | 21.00               | 450                   | 9450                  | 6.8%                     | 61.4%                                 | B              |
| IN0010                       | Noyah Lipstick   | 36.00               | 250                   | 9000                  | 6.4%                     | 67.8%                                 | B              |
| IN0012                       | Pure Anada Liquid Foundation                             | 34.47               | 200                   | 6894                  | 4.9%                     | 72.8%                                 | B              |
| IN0005                       | Darcy's Botanicals Pumpkin seed moisturizing conditioner | 24.00               | 250                   | 6000                  | 4.3%                     | 77.1%                                 | B              |
| IN0007                       | Avocado and honey twisting cream                         | 24.00               | 250                   | 6000                  | 4.3%                     | 81.3%                                 | B              |
| IN0009                       | Novan Coconut Oil  | 12.00               | 500                   | 6000                  | 4.3%                     | 85.6%                                 | B              |
| IN0006                       | Darcy's Botanicals leave-in                              | 24.00               | 200                   | 4800                  | 3.4%                     | 89.1%                                 | B              |
| IN0013                       | Pure Anada Pressed Powder                                | 40.00               | 100                   | 4000                  | 2.9%                     | 91.9%                                 | B              |
| IN0016                       | Pure Anada Mascara                                       | 32.00               | 100                   | 3200                  | 2.3%                     | 94.2%                                 | B              |
| IN0014                       | Pure Anada Lipstick                                      | 21.00               | 120                   | 2520                  | 1.8%                     | 96.0%                                 | C              |
| IN0011                       | Pure Anada Eye liner                                     | 21.00               | 120                   | 2520                  | 1.8%                     | 97.8%                                 | C              |
| IN0015                       | Pure Anada Foundation brush                              | 26.67               | 70                    | 1867                  | 1.3%                     | 99.1%                                 | C              |
| IN0008                       | Hurraw lipbalm   | 8.00                | 150                   | 1200                  | 0.9%                     | 100.0%                                | C              |
|                              |  |                     | Total                 | 139947                | 100.0%                   |                                       |                |

The table above shows a list of all the products sold by Emels. To determine which product needs adverse attention and which contribute to a larger portion of the annual turnover, the ABC classification tool was employed. Products classified under 'A', are deemed very important as they contribute to 10% and above of the company's annual turnover. That being notified, Emels needs to give these products a lot of attention by regularly conducting inspections to make sure there is more than enough in stock. Products classified under 'B' are important and contribute to less than 10% but more than 2% of annual turnover, whereas those classified under 'C' are marginally important and contribute less than 2% of the annual turnover.

**EOQ Tool**

| Economic Order Quantity |  |                 |                       |                     |                         |                  |                   |                                |               |                           |
|-------------------------|--|-----------------|-----------------------|---------------------|-------------------------|------------------|-------------------|--------------------------------|---------------|---------------------------|
| Inventory ID            | Product Name   | Unit Cost (GHS) | Annual Demand (Units) | Ordering Cost (GHS) | Unit Holding Cost (GHS) | Lead Time (days) | Working Days/Year | Optimal Order Quantity (units) | Reorder point | Total Variable Cost (GHS) |
| IN0001                  | Alaffia Beautiful curls leave-in conditioner             | 31.64           | 500                   | 200                 | 7.91                    | 14               | 365               | 159                            | 19            | 239.55                    |
| IN0002                  | Alaffia Shampoo  | 23.64           | 700                   | 200                 | 5.91                    | 14               | 365               | 218                            | 27            | 229.55                    |
| IN0003                  | Alaffia Conditioner                                      | 23.64           | 700                   | 200                 | 5.91                    | 14               | 365               | 218                            | 27            | 229.55                    |
| IN0004                  | Alaffia Beautiful curls shampoo                          | 31.64           | 500                   | 200                 | 7.91                    | 14               | 365               | 159                            | 19            | 239.55                    |
| IN0005                  | Darcy's Botanicals Pumpkin seed moisturizing conditioner | 24              | 250                   | 80                  | 6                       | 14               | 365               | 82                             | 10            | 110.00                    |
| IN0006                  | Darcy's Botanicals leave-in                              | 24              | 200                   | 90                  | 6                       | 14               | 365               | 77                             | 8             | 120.00                    |
| IN0007                  | Avocado and honey twisting cream                         | 24              | 250                   | 120                 | 6                       | 14               | 365               | 100                            | 10            | 150.00                    |
| IN0008                  | Hurraw lipbalm   | 8               | 150                   | 150                 | 2                       | 14               | 365               | 150                            | 6             | 160.00                    |
| IN0009                  | Novan Coconut Oil  | 12              | 500                   | 10                  | 3                       | 2                | 365               | 58                             | 3             | 25.00                     |
| IN0010                  | Noyah Lipstick   | 36              | 250                   | 150                 | 9                       | 14               | 365               | 91                             | 10            | 195.00                    |
| IN0011                  | Pure Anada Eye liner                                     | 21              | 120                   | 100                 | 5.25                    | 14               | 365               | 68                             | 5             | 126.25                    |
| IN0012                  | Pure Anada Liquid Foundation                             | 34.47           | 200                   | 100                 | 8.6175                  | 14               | 365               | 68                             | 8             | 143.09                    |
| IN0013                  | Pure Anada Pressed Powder                                | 40              | 100                   | 100                 | 10                      | 14               | 365               | 45                             | 4             | 150.00                    |
| IN0014                  | Pure Anada Lipstick                                      | 21              | 120                   | 100                 | 5.25                    | 14               | 365               | 68                             | 5             | 126.25                    |
| IN0015                  | Pure Anada Foundation brush                              | 26.67           | 70                    | 100                 | 6.6675                  | 14               | 365               | 46                             | 3             | 133.34                    |
| IN0016                  | Pure Anada Mascara                                       | 32              | 100                   | 100                 | 8                       | 14               | 365               | 50                             | 4             | 140.00                    |
| IN0017                  | Skin Gourmet's Baobab & Shea Body Butter                 | 21              | 450                   | 10                  | 5.25                    | 2                | 365               | 41                             | 2             | 36.25                     |
| IN0018                  | Detoxifying clay mask                                    | 21              | 560                   | 10                  | 5.25                    | 2                | 365               | 46                             | 3             | 36.25                     |

The table above shows the various inputs used in the calculation for the optimal order quantity for each product. The inputs taken into consideration are the annual demand, ordering cost and unit holding cost of each product. The optimal order quantity section determines the maximum quantity of each product that needs to be ordered, which would enable the company minimize cost and maximize its capacity. Also, information pertaining to variable cost is provided, which indicates the costs associated with retrieving products from suppliers, cost of each unit of product as well as cost of holding the products. The reorder point aids in determining the level at which products need to be ordered.

## Inventory Tool

| Inventory Control List          |  |                    |                  |                   |                       |  |                      |              |               |
|---------------------------------|--|--------------------|------------------|-------------------|-----------------------|--|----------------------|--------------|---------------|
| Highlight items to reorder? Yes |  |                    |                  |                   |                       |  |                      |              |               |
| Inventory ID                    | Product Name   | Supplier           | Unit Price (GH₵) | Quantity in Stock | Inventory Value (GH₵) | Reorder Level (safety stock inclusive) | Reorder Time in Days | Safety Stock | Discontinued? |
| IN0001                          | Alaffia Beautiful curls leave-in conditioner             | Alaffia            | 55               | 48                | 2640                  | 50                                     | 14                   | 34           |               |
| IN0002                          | Alaffia Shampoo  | Alaffia            | 38               | 100               | 3800                  | 37                                     | 14                   | 19           |               |
| IN0003                          | Alaffia Conditioner                                      | Alaffia            | 40               | 100               | 4000                  | 21                                     | 14                   | 7            |               |
| IN0004                          | Alaffia Beautiful curls shampoo                          | Alaffia            | 55               | 48                | 2640                  | 51                                     | 14                   | 33           |               |
| IN0005                          | Darcy's Botanicals Pumpkin seed moisturizing conditioner | Darcy's Botanicals | 45               | 50                | 2250                  | 50                                     | 14                   | 34           |               |
| IN0006                          | Darcy's Botanicals leave-in                              | Darcy's Botanicals | 45               | 50                | 2250                  | 51                                     | 14                   | 33           |               |
| IN0007                          | Avocado and honey twisting cream                         | Darcy's Botanicals | 45               | 50                | 2250                  | 21                                     | 14                   | 7            | yes           |
| IN0008                          | Hurraw lipbalm   | Hurraw!            | 20               | 24                | 480                   | 197                                    | 14                   | 168          |               |
| IN0009                          | Novan Coconut Oil  | Novan              | 15               | 20                | 300                   | 27                                     | 2                    | 21           |               |
| IN0010                          | Noyah Lipstick   | Noyah              | 90               | 58                | 5220                  | 53                                     | 14                   | 32           |               |
| IN0011                          | Pure Anada Eye liner                                     | Pure Anada         | 30               | 30                | 900                   | 21                                     | 14                   | 7            |               |
| IN0012                          | Pure Anada Liquid Foundation                             | Pure Anada         | 90               | 76                | 6840                  | 36                                     | 14                   | 20           |               |
| IN0013                          | Pure Anada Pressed Powder                                | Pure Anada         | 65               | 76                | 4940                  | 21                                     | 14                   | 7            |               |
| IN0014                          | Pure Anada Lipstick                                      | Pure Anada         | 45               | 150               | 6750                  | 67                                     | 14                   | 45           |               |
| IN0015                          | Pure Anada Foundation brush                              | Pure Anada         | 55               | 18                | 990                   | 21                                     | 14                   | 7            |               |
| IN0016                          | Pure Anada Mascara                                       | Pure Anada         | 50               | 18                | 900                   | 140                                    | 14                   | 112          |               |
| IN0017                          | Skin Gourmet's Baobab & Shea Body Butter                 | Skin Gourmet       | 30               | 10                | 300                   | 22                                     | 2                    | 18           |               |
| IN0018                          | Detoxifying clay mask                                    | Skin Gourmet       | 30               | 30                | 900                   | 23                                     | 2                    | 18           |               |

The figure above shows some of the various items sold by Emels with their corresponding suppliers. Quantity in stock is to be updated as of when orders are made by customers. A product is highlighted when the quantity in stock is less than the reorder level. This means that the product is running out and as such needs to be replenished as soon as possible, to prevent stock outs. The reorder level (with safety stock), informs the quantity of each product which needs to be order, while taking into consideration its safety stock.

Also, in the case where a product is no longer being sold, a “yes” can be indicated in the discontinued section and it automatically has a strikethrough. As such, in the case where the company wants to bring the product back, all

previous information would still be available, as opposed to completely deleting all information about the product.

#### **4.5 CHAPTER CONCLUSION**

When managing inventory for a retail business, inventory management can be very critical for optimizing sales and productivity. A small online retail store like Emels Ghana would benefit from the ease and thoroughness of the google spreadsheets. All information needed to effectively and efficiently manage inventory would be kept in one place, while preventing overstocking and aiding in determining the actual quantity per product needed.

## **CHAPTER 5: CONCLUSION AND RECOMMENDATIONS**

### **Recommendations**

Based on the findings and literature, it is recommended that the company takes its time to go through the detailed outline of the tool to understand where inputs are to be made and at what time. Also, one administrator should be appointed to control the tool so as to prevent the events of inconsistency and errors. However, from time to time, two other staff members should be trained on how to use the tool and the importance of each input made into the tool. This is because the company is dealing with human beings and anything can happen to anyone at any point in time. As such having backup administrators would ensure the continuity of effectively tracking inventory.

Also, the owner and co-owners of Emels should make it a point to crosscheck inputs made on the tool in order to make sure there are no errors and the administrator is working as intended. Inventory held in stock should match what is stated on the tool, hence efficiency. They would also be able to track which products are doing well on the market due to the trends in demand and determine which products need to be discontinued or which need to be reduced in stock.

Also, there is the need to build a strong relationship with suppliers so that in the case where products have been discontinued but want to be brought back into the store, contacting suppliers would not be difficult. Through building that relationship, suppliers can also direct clients to Emels, which would boost sales and their clientele.

**Conclusion**

By incorporating the proposed tool effectively and as described, Emels stands a chance of curbing its inventory management deficiency. This tool would help the company reduce the amount of inventory held in storage, know when to reorder and the right quantity of products to order as well as forecast demand more accurately. This would enable the company to satisfy customers' demand, which would result in an increase in sales.

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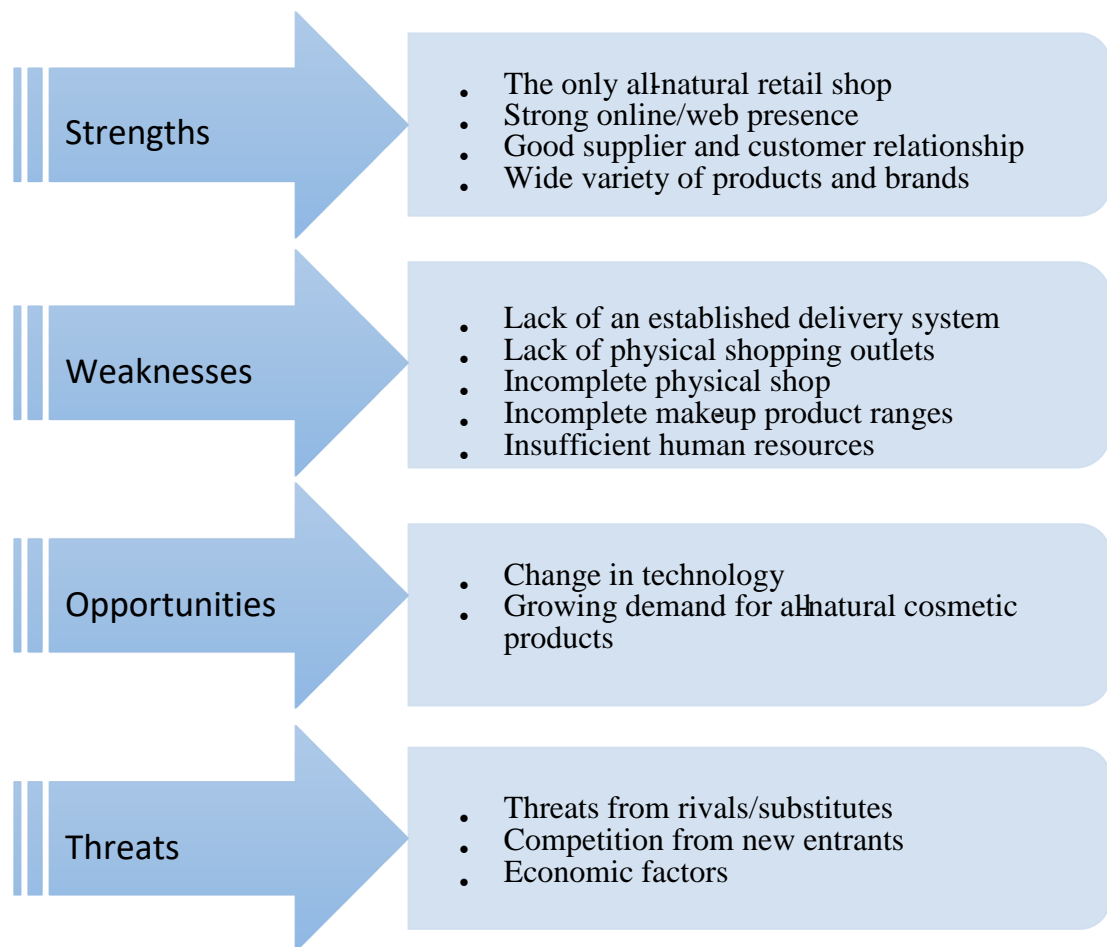
**APPENDIX****Figure 1: Swot Analysis of Emels Ghana**

Figure 2: Website of Emels Ghana Ltd

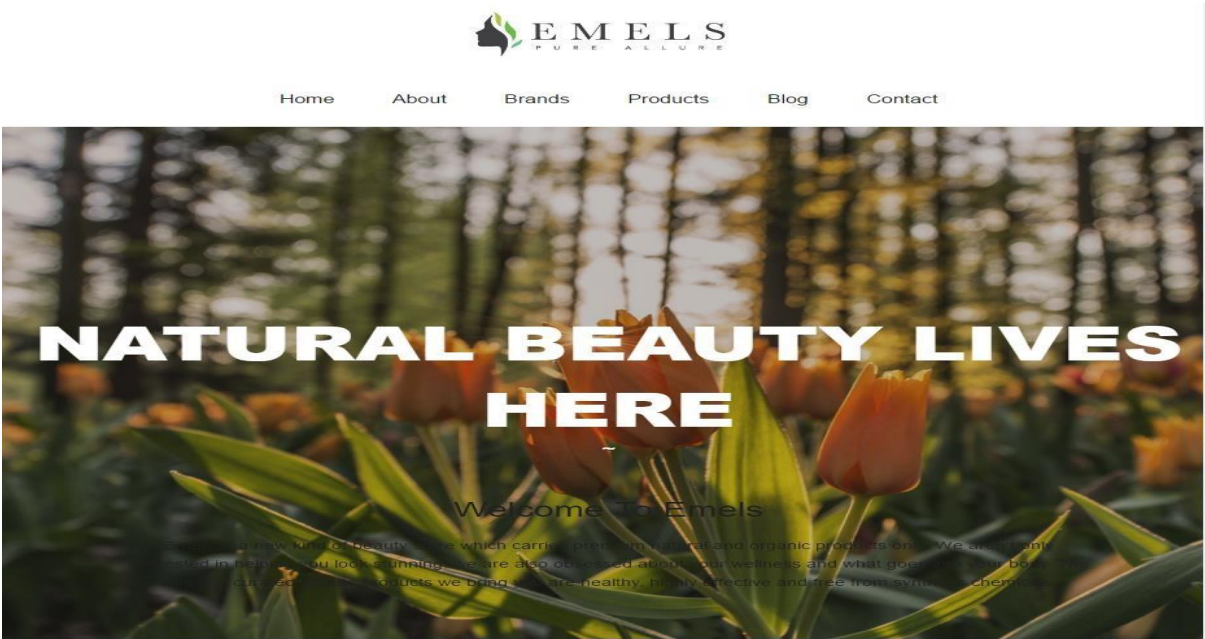


Figure 3: Trusted Brands of Emels Ghana Ltd



**Figure 4: ABC Classification Tool for Items**

| ABC INVENTORY CLASSIFICATION |  |                     |                       |                       |                          |                                       |                |
|------------------------------|--|---------------------|-----------------------|-----------------------|--------------------------|---------------------------------------|----------------|
| Inventory Id                 | Product Name   | Cost per Unit (GHS) | Annual Demand (Units) | Annual Turnover (GHS) | Contribution to Turnover | Cumulative Percentage Annual Turnover | Classification |
| IN0003                       | Alaffia Conditioner                                      | 23.64               | 700                   | 16548                 | 11.8%                    | 11.8%                                 | A              |
| IN0002                       | Alaffia Shampoo  | 23.64               | 700                   | 16548                 | 11.8%                    | 23.6%                                 | A              |
| IN0001                       | Alaffia Beautiful curls leave-in conditioner             | 31.64               | 500                   | 15820                 | 11.3%                    | 35.0%                                 | A              |
| IN0004                       | Alaffia Beautiful curls shampoo                          | 31.64               | 500                   | 15820                 | 11.3%                    | 46.3%                                 | A              |
| IN0018                       | Detoxifying clay mask                                    | 21.00               | 560                   | 11760                 | 8.4%                     | 54.7%                                 | B              |
| IN0017                       | Skin Gourmet's Baobab & Shea Body Butter                 | 21.00               | 450                   | 9450                  | 6.8%                     | 61.4%                                 | B              |
| IN0010                       | Noyah Lipstick   | 36.00               | 250                   | 9000                  | 6.4%                     | 67.8%                                 | B              |
| IN0012                       | Pure Anada Liquid Foundation                             | 34.47               | 200                   | 6894                  | 4.9%                     | 72.8%                                 | B              |
| IN0005                       | Darcy's Botanicals Pumpkin seed moisturizing conditioner | 24.00               | 250                   | 6000                  | 4.3%                     | 77.1%                                 | B              |
| IN0007                       | Avocado and honey twisting cream                         | 24.00               | 250                   | 6000                  | 4.3%                     | 81.3%                                 | B              |
| IN0009                       | Novan Coconut Oil  | 12.00               | 500                   | 6000                  | 4.3%                     | 85.6%                                 | B              |
| IN0006                       | Darcy's Botanicals leave-in                              | 24.00               | 200                   | 4800                  | 3.4%                     | 89.1%                                 | B              |
| IN0013                       | Pure Anada Pressed Powder                                | 40.00               | 100                   | 4000                  | 2.9%                     | 91.9%                                 | B              |
| IN0016                       | Pure Anada Mascara                                       | 32.00               | 100                   | 3200                  | 2.3%                     | 94.2%                                 | B              |
| IN0014                       | Pure Anada Lipstick                                      | 21.00               | 120                   | 2520                  | 1.8%                     | 96.0%                                 | C              |
| IN0011                       | Pure Anada Eye liner                                     | 21.00               | 120                   | 2520                  | 1.8%                     | 97.8%                                 | C              |
| IN0015                       | Pure Anada Foundation brush                              | 26.67               | 70                    | 1867                  | 1.3%                     | 99.1%                                 | C              |
| IN0008                       | Hurraw lipbalm   | 8.00                | 150                   | 1200                  | 0.9%                     | 100.0%                                | C              |
|                              |  |                     | Total                 | 139947                | 100.0%                   |                                       |                |

**Figure 5: EOQ Model Tool for Items**

| Economic Order Quantity |  |                 |                       |                     |                         |                  |                   |                                |               |                           |
|-------------------------|--|-----------------|-----------------------|---------------------|-------------------------|------------------|-------------------|--------------------------------|---------------|---------------------------|
| Inventory ID            | Product Name   | Unit Cost (GHS) | Annual Demand (Units) | Ordering Cost (GHS) | Unit Holding Cost (GHS) | Lead Time (days) | Working Days/Year | Optimal Order Quantity (units) | Reorder point | Total Variable Cost (GHS) |
| IN0001                  | Alaffia Beautiful curls leave-in conditioner             | 31.64           | 500                   | 200                 | 7.91                    | 14               | 365               | 159                            | 19            | 239.55                    |
| IN0002                  | Alaffia Shampoo  | 23.64           | 700                   | 200                 | 5.91                    | 14               | 365               | 218                            | 27            | 229.55                    |
| IN0003                  | Alaffia Conditioner                                      | 23.64           | 700                   | 200                 | 5.91                    | 14               | 365               | 218                            | 27            | 229.55                    |
| IN0004                  | Alaffia Beautiful curls shampoo                          | 31.64           | 500                   | 200                 | 7.91                    | 14               | 365               | 159                            | 19            | 239.55                    |
| IN0005                  | Darcy's Botanicals Pumpkin seed moisturizing conditioner | 24              | 250                   | 80                  | 6                       | 14               | 365               | 82                             | 10            | 110.00                    |
| IN0006                  | Darcy's Botanicals leave-in                              | 24              | 200                   | 90                  | 6                       | 14               | 365               | 77                             | 8             | 120.00                    |
| IN0007                  | Avocado and honey twisting cream                         | 24              | 250                   | 120                 | 6                       | 14               | 365               | 100                            | 10            | 150.00                    |
| IN0008                  | Hurraw lipbalm   | 8               | 150                   | 150                 | 2                       | 14               | 365               | 150                            | 6             | 160.00                    |
| IN0009                  | Novan Coconut Oil  | 12              | 500                   | 10                  | 3                       | 2                | 365               | 58                             | 3             | 25.00                     |
| IN0010                  | Noyah Lipstick   | 36              | 250                   | 150                 | 9                       | 14               | 365               | 91                             | 10            | 195.00                    |
| IN0011                  | Pure Anada Eye liner                                     | 21              | 120                   | 100                 | 5.25                    | 14               | 365               | 68                             | 5             | 126.25                    |
| IN0012                  | Pure Anada Liquid Foundation                             | 34.47           | 200                   | 100                 | 8.6175                  | 14               | 365               | 68                             | 8             | 143.09                    |
| IN0013                  | Pure Anada Pressed Powder                                | 40              | 100                   | 100                 | 10                      | 14               | 365               | 45                             | 4             | 150.00                    |
| IN0014                  | Pure Anada Lipstick                                      | 21              | 120                   | 100                 | 5.25                    | 14               | 365               | 68                             | 5             | 126.25                    |
| IN0015                  | Pure Anada Foundation brush                              | 26.67           | 70                    | 100                 | 6.6675                  | 14               | 365               | 46                             | 3             | 133.34                    |
| IN0016                  | Pure Anada Mascara                                       | 32              | 100                   | 100                 | 8                       | 14               | 365               | 50                             | 4             | 140.00                    |
| IN0017                  | Skin Gourmet's Baobab & Shea Body Butter                 | 21              | 450                   | 10                  | 5.25                    | 2                | 365               | 41                             | 2             | 36.25                     |
| IN0018                  | Detoxifying clay mask                                    | 21              | 560                   | 10                  | 5.25                    | 2                | 365               | 46                             | 3             | 36.25                     |

**Figure 6: Inventory Control Tool for Items**

| Inventory Control List          |  |                    |                  |                   |                       |  |                      |              |               |
|---------------------------------|--|--------------------|------------------|-------------------|-----------------------|--|----------------------|--------------|---------------|
| Highlight items to reorder? Yes |  |                    |                  |                   |                       |  |                      |              |               |
| Inventory ID                    | Product Name   | Supplier           | Unit Price (GHS) | Quantity in Stock | Inventory Value (GHS) | Reorder Level (safety stock inclusive) | Reorder Time in Days | Safety Stock | Discontinued? |
| IN0001                          | Alaffia Beautiful curls leave-in conditioner             | Alaffia            | 55               | 48                | 2640                  | 50                                     | 14                   | 34           |               |
| IN0002                          | Alaffia Shampoo  | Alaffia            | 38               | 100               | 3800                  | 37                                     | 14                   | 19           |               |
| IN0003                          | Alaffia Conditioner                                      | Alaffia            | 40               | 100               | 4000                  | 21                                     | 14                   | 7            |               |
| IN0004                          | Alaffia Beautiful curls shampoo                          | Alaffia            | 55               | 48                | 2640                  | 51                                     | 14                   | 33           |               |
| IN0005                          | Darcy's Botanicals Pumpkin seed moisturizing conditioner | Darcy's Botanicals | 45               | 50                | 2250                  | 50                                     | 14                   | 34           |               |
| IN0006                          | Darcy's Botanicals leave-in                              | Darcy's Botanicals | 45               | 50                | 2250                  | 51                                     | 14                   | 33           |               |
| IN0007                          | Avocado and honey twisting cream                         | Darcy's Botanicals | 45               | 50                | 2250                  | 21                                     | 14                   | 7            | yes           |
| IN0008                          | Hurraw lipbalm   | Hurraw!            | 20               | 24                | 480                   | 197                                    | 14                   | 168          |               |
| IN0009                          | Novan Coconut Oil  | Novan              | 15               | 20                | 300                   | 27                                     | 2                    | 21           |               |
| IN0010                          | Noyah Lipstick   | Noyah              | 90               | 58                | 5220                  | 53                                     | 14                   | 32           |               |
| IN0011                          | Pure Anada Eye liner                                     | Pure Anada         | 30               | 30                | 900                   | 21                                     | 14                   | 7            |               |
| IN0012                          | Pure Anada Liquid Foundation                             | Pure Anada         | 90               | 76                | 6840                  | 36                                     | 14                   | 20           |               |
| IN0013                          | Pure Anada Pressed Powder                                | Pure Anada         | 65               | 76                | 4940                  | 21                                     | 14                   | 7            |               |
| IN0014                          | Pure Anada Lipstick                                      | Pure Anada         | 45               | 150               | 6750                  | 67                                     | 14                   | 45           |               |
| IN0015                          | Pure Anada Foundation brush                              | Pure Anada         | 55               | 18                | 990                   | 21                                     | 14                   | 7            |               |
| IN0016                          | Pure Anada Mascara                                       | Pure Anada         | 50               | 18                | 900                   | 140                                    | 14                   | 112          |               |
| IN0017                          | Skin Gourmet's Baobab & Shea Body Butter                 | Skin Gourmet       | 30               | 10                | 300                   | 22                                     | 2                    | 18           |               |
| IN0018                          | Detoxifying clay mask                                    | Skin Gourmet       | 30               | 30                | 900                   | 23                                     | 2                    | 18           |               |

**Table 1: Formulas used**

|                               |   |
|-------------------------------|---|
| <i>Reorder level</i>          | $(\text{Annual demand/number of working days/year}) * \text{lead time in days}$   |
| <i>Safety stock</i>           | $(\text{Maximum daily usage} * \text{Maximum lead time in days}) - (\text{Average daily usage} * \text{Average lead time in days})$ |
| <i>Optimal order quantity</i> | $\sqrt{(2 * \text{annual demand} * \text{ordering cost} / \text{holding cost})}$  |